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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/930,295	08/16/2001	Alan G. Wood	M4065.0184/P184-A	9495

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EXAMINER

CHU, CHRIS C

ART UNIT PAPER NUMBER

2815

DATE MAILED: 12/14/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/930,295

Applicant(s)

WOOD ET AL.

Examiner

Chris C. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 24 - 34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 24 - 34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The preliminary amendment filed on September 26, 2001 has been received and entered in this office action.

Cancel claims: 1 – 23 and 25 – 38.

Specification

2. The disclosure is objected to because of the following informalities:

On page 5, lines 27 and 28, “the edges” should be --edges--.

On page 6, line 3, “the top surface” should be --a top surface--.

On page 8, line 16, “the edges” should be --edges--.

On page 9, lines 15 and 25, “the edges” should be --edges--.

On page 9, line 22, “the package” should be --a package--.

Appropriate correction is required.

Claim Objections

3. Claim 30 is objected to because of the following informalities: “comprise” should be --comprise--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 24 ~ 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 24, line 4, "said substrate" lacks antecedent basis.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 24 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Heo et al.

Note Fig. 8A of Heo et al., where he/she shows a semiconductor device package, comprising: a semiconductor device (11) having edges formed by a dicing operation; a dielectric substrate (21) having edges formed by said dicing operation; a ball grid array (24 in Fig. 8B) on said dielectric substrate (see Fig. 8A), said substrate (21) being located between said

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semiconductor device and said ball grid array (see Fig. 8A); and electrical connections (40) between said semiconductor device and said ball grid array (see Fig. 8A). Further, the method of forming a device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight.

Regarding claim 34, note Fig. 8A of Heo et al., where he/she shows further comprising an insulative solder mask (22) for covering said dielectric substrate (see Fig. 8A).

8. Claims 24 ~ 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Marcantonio.

Note Fig. 4 of Marcantonio, where he/she shows a semiconductor device package, comprising: a semiconductor device (212) having edges formed by a dicing operation; a dielectric substrate (228) having edges formed by said dicing operation; a ball grid array (231) on said dielectric substrate (see Fig. 4), said substrate (228) being located between said semiconductor device and said ball grid array (see Fig. 4); and electrical connections (218) between said semiconductor device and said ball grid array (see Fig. 4). Further, the method of forming a device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight.

Regarding claim 25, Marcantonio discloses a metal layer (414, in Fig. 6) having edges formed by said dicing operation. Further, the method of forming a device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight.

Regarding claim 26, Marcantonio discloses said metal layer (414, in Fig. 6) provides a ground plane for said electrical connections (read column 5, lines 63 ~ 65).

Regarding claim 27, Marcantonio discloses said semiconductor device is located between said metal layer and said dielectric substrate.

Regarding claim 28, Marcantonio discloses said metal layer (414, in Fig. 6) is arranged to dissipate heat from said semiconductor device (read column 5, lines 63 ~ 65).

Regarding claim 29, Marcantonio discloses said metal layer (414, in Fig. 6) comprises copper (read column 7, lines 24 ~ 26).

Regarding claim 30, note Fig. 4 of Marcantonio, where he/she shows said connections (218) comprise wire bonds (see Fig. 4).

Regarding claim 31, note Fig. 4 of Marcantonio, where he/she shows said connections (218) comprise conductive vias (242 and see Fig. 4).

Regarding claim 32, note Fig. 4 of Marcantonio, where he/she shows said connections (218) further comprise conductive traces (240) on opposite sides of said substrate (see Fig. 4).

Regarding claim 33, note Fig. 4 of Marcantonio, where he/she shows a semiconductor device package, further comprising solder bumps (216) on said semiconductor device, said bumps connected to said traces (see Fig. 4).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Marcantonio in view of Green.

Marcantonio discloses the claimed invention except for an insulative solder mask for covering said dielectric substrate. However, Green shows that an insulative solder mask (4 in Fig. 1) for covering said dielectric substrate (see Fig. 1). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Marcantonio by including solder mask for covering said dielectric substrate as taught by Green. The ordinary artisan would have been motivated to modify Marcantonio in the manner described above for at least the purpose of increasing reliability of the package.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Arai et al., Kinsman, Kinsman et al., Mertol, and Bai et al. disclose a semiconductor package.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the

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organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Chris C. Chu
Examiner
Art Unit 2815

c.c.
December 11, 2001

A handwritten signature in black ink, appearing to read "Eddie Lee", is written over a circular stamp.

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800